

AMENDMENT

(Amendment by Provision of the Law Article 11)

To : Examiner of the Patent Office

(Seal)

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1. Identification of the International Application

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4. Object of Amendment Specification and Claims

5. Details of the Amendment

(1) Specification page 3, lines 13 – 17 (English translation [0008], page 3, lines 19 – 27) “In order to attain the above-mentioned object, a method of catalytic reaction of the present invention is a method of catalytic reaction using a micro-reactor with a metal or a metal complex catalyst supported as a solid phase on the inner wall of a

channel, characterized to flow the solution as a liquid phase in which the reactants are dissolved and the gas as a gas phase through a channel in a pipe flow state, thereby to conduct the reaction of a solution and a gas accelerated by a metal catalyst or a metal complex catalyst in the three phase catalytic reaction of solid – liquid – gas phases.” is amended as shown below.

-- In order to attain the above-mentioned object, the present invention is a method of catalytic reaction using a micro-reactor with a metal catalyst or a metal complex catalyst supported as a solid phase on the inner wall of a channel, characterized in that the metal catalyst or the metal complex catalyst is a catalyst incorporated in a polymer, said catalyst is supported on the inner wall of a channel by covalent bond of a modified group provided on the inner wall of a channel and the polymer, a gas as a gas phase is passed at the center part of the channel, a solution as a liquid phase in which a reactant is dissolved is passed between the gas and the catalyst supported on the inner wall of a channel, thereby the reaction of the solution and the gas is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by the metal catalyst or the metal complex catalyst. --.

(2) Specification page 3, lines 19 – 24 (English translation [0009], page 3, line 30 – page 4, line 3) “Also, a catalytic reaction of the present invention using a micro-reactor is a method of catalytic reductive reaction using a micro-reactor with a metal or a metal complex catalyst supported as a solid phase on the inner wall of a channel, characterized to flow the solution as a liquid phase in which the substance to be reduced is dissolved and hydrogen as a gas phase through a channel in a pipe flow state, thereby to conduct the reaction of a solution and a gas accelerated by a metal catalyst or a metal complex catalyst in the three phase catalytic reductive reaction of solid – liquid – gas phases.” is amended as shown below.

-- Also, another aspect of the present invention is a method of catalytic reductive reaction using a micro-reactor with a metal or a metal complex catalyst supported as a solid phase on the inner wall of

a channel, characterized in that the metal catalyst or the metal complex catalyst is a catalyst incorporated in a polymer, said catalyst is supported on the inner wall of a channel by covalent bond of a modified group provided on the inner wall of a channel and the polymer, hydrogen as a gas phase is passed at the center part of the channel, a solution as a liquid phase in which a reactant is dissolved is passed between hydrogen and the catalyst supported on the inner wall of a channel, thereby the reaction of the solution and hydrogen is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by the metal catalyst or the metal complex catalyst. --.

(3) Specification page 3, lines 27 – 28 (English translation [0010], page 4, lines 8 – 9) “the metal catalyst or the metal complex catalyst is preferably incorporated in a polymer.” is deleted.

(4) Claims page 13, Claim 1, lines 1 – 6 (English translation Claims page 14, Claim 1, lines 1 – 10) “A method of catalytic reaction using a micro-reactor, characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on the inner wall of the channel,

a solution dissolving a reactant as a liquid phase and a gas as a gas phase are flown through said channel in pipe flow state, and

three phase catalytic reaction of solid – liquid – gas phases is conducted in which the reaction of said solution and said gas is accelerated by said metal catalyst or said metal complex catalyst.” is amended as shown below.

-- A method of catalytic reaction using a micro-reactor, characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on the inner wall of the channel, characterized in that

said metal catalyst or said metal complex catalyst is a catalyst incorporated in a polymer,

said catalyst is supported on the inner wall of a channel by covalent bond of a modified group provided on the inner wall of a channel and the polymer,

a gas as a gas phase is passed at the center part of the channel,

a solution as a liquid phase in which a reactant is dissolved is passed between said gas and said catalyst supported on the inner wall of a channel,

thereby the reaction of said solution and said gas is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by said metal catalyst or said metal complex catalyst. --.

(5) Claims page 13, Claim 2 (English translation Claims page 14, Claim 2) is deleted.

(6) Claims page 13, Claims 3, 4, 5, and 6 (English translation Claims page 14, Claims 3, 4, 5, and 6) "Claim 1 or 2" is amended to -- Claim 1 --.

(7) Claims pages 13 – 14, Claim 8, lines 1 – 6 (English translation Claims page 15, Claim 8, lines 1 – 12) "A method of catalytic reaction using a micro-reactor, characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on the inner wall of the channel,

a solution dissolving a substance to be reduced as a liquid phase and hydrogen as a gas phase are flown through said channel in pipe flow state, and

three phase catalytic reductive reaction of solid – liquid – gas phases is conducted in which the reaction of said solution and said gas is accelerated by said metal catalyst or said metal complex catalyst." is amended as shown below.

-- A method of catalytic reaction using a micro-reactor, characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on the inner wall of the channel,

said metal catalyst or said metal complex catalyst is a catalyst incorporated in a polymer,

said catalyst is supported on the inner wall of a channel by covalent bond of a modified group provided on the inner wall of a channel and the polymer,

hydrogen as a gas phase is passed at the center part of the channel,

a solution as a liquid phase in which a reactant is dissolved is passed between said hydrogen and said catalyst supported on the inner wall of a channel,

thereby the reaction of said solution and said hydrogen is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by said metal catalyst or said metal complex catalyst. --.

(8) Claims page 14, Claim 9 (English translation Claims page 15, Claim 9) is deleted.

(9) Claims page 14, Claims 10, 11, 12, and 13 (English translation Claims pages 15 – 16, Claims 10, 11, 12, and 13) "Claim 8 or 9" is amended to

-- Claim 8 --.

6. List of Papers Attached:

- (1) Specification, Substitute sheets, page 3, page 3/1 (English translation, Substitute sheets, page 3, 3/1, 4)
- (2) Claims, Substitute sheets, page 13, 14 (English translation, Substitute sheets, page 14, 14/1, 15, 15/1, 16)

Claims:

What is claimed is:

1. (amended) A method of catalytic reaction using a micro-reactor, characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on the inner wall of the channel, characterized in that

said metal catalyst or said metal complex catalyst is a catalyst incorporated in a polymer,

said catalyst is supported on the inner wall of a channel by covalent bond of a modified group provided on the inner wall of a channel and the polymer,

a gas as a gas phase is passed at the center part of the channel,

a solution as a liquid phase in which a reactant is dissolved is passed between said gas and said catalyst supported on the inner wall of a channel,

thereby the reaction of said solution and said gas is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by said metal catalyst or said metal complex catalyst.

2. (deleted)

3. (amended) The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal catalyst is palladium.

4. (amended) The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal catalyst is either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

5. (amended) The method of catalytic reaction using a

micro-reactor as set forth in claim 1, characterized in that said metal complex catalyst is a palladium complex catalyst.

6. (amended) The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal complex catalyst is a metal complex catalyst of either one of chromium,

manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

7. The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said gas phase consists of hydrogen or carbon monoxide.

8. (amended) A method of catalytic reaction using a micro-reactor, characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on the inner wall of the channel,

said metal catalyst or said metal complex catalyst is a catalyst incorporated in a polymer,

said catalyst is supported on the inner wall of a channel by covalent bond of a modified group provided on the inner wall of a channel and the polymer,

hydrogen as a gas phase is passed at the center part of the channel,

a solution as a liquid phase in which a reactant is dissolved is passed between said hydrogen and said catalyst supported on the inner wall of a channel,

thereby the reaction of said solution and said hydrogen is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by said metal catalyst or said metal complex catalyst.

9. (deleted)

10. (amended) The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that said metal catalyst is palladium.

11. (amended) The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that said metal

catalyst is either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

12. (amended) The method of catalytic reaction using a micro-reactor as

set forth in claim 8, characterized in that said metal complex catalyst is a palladium complex catalyst.

13. (amended) The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that said metal complex catalyst is a metal complex catalyst of either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.
tungsten, osmium, iridium, and palladium.